Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**POM Lesson 2.1 pg. 16-17 (Read and follow the directions)**

Formula for density:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

cm = \_\_\_\_\_\_\_\_\_\_\_(same as liquid volume)

**Problem: How can you find the density of liquids?**

Independent variable:\_\_\_2 different volumes of water (25mL and 50mL)

Dependent variable\_\_\_\_\_the density of water based off of the different volumes

Hypothesis: If I change the volume of water from 25mL to 50mL, then the density of the water will\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_?

Calculating Density of water

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Volume of Water  (mL) | Mass of graduated cylinder and water  (g) | Mass of graduated cylinder (g) | Mass of grad. Cylinder and water  Minus  Mass of graduated cylinder (g) | Density of  Water  Mass g  Volume mL |
| 25 mL |  |  |  | g  mL |
| 50mL |  |  |  | g  mL |

1. Explain the steps you used to find the density of water

1.

2.

3.

4.

5.

6.

7.

1. Does changing the volume of water change the mass of 1 mL of water?
2. Go back to your hypothesis and state if you were correct.

Write a new statement that is true: If I change the volume of water from 25 mL to 50 mL, then the density of water will\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Water has a density of\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**POM Lesson 2.2**

**Read about Density of pg 20.**

Formula for Density\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Density is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because all objects that are made of the same material have the same density.

**Read directions on pg. 18**

**Problem**: **How do you find the density of regular shaped objects?**

Independent variables: Different regular shaped objects: aluminum, wax, clear plastic, white plastic

Dependent variables: the density of each of the 4 objects will change depending of their mass and their volume.

Hypothesis: If I I find the mass and volume of aluminum, wax, clear plastic, and white plastic, then \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use a ruler to measure each substance precisely.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Substance | Length  (cm)  L | Width  (cm)  W | Height  (cm)  H | Volume  (cm )  l x w x h | Mass  (g) | Density  Mass (g)  Volume (cm ) |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

1. Do any of the substances have the same density? Explain

2. Compare each density with the density of water and write a statement about each.

1. Wax has a density of \_\_\_\_\_\_\_\_\_\_\_. This is \_\_\_\_\_\_\_\_than water.
2. Aluminum has a density of \_\_\_\_\_\_\_\_\_\_\_\_\_. This is \_\_\_\_\_\_\_than water.
3. White plactic has a density of \_\_\_\_\_\_\_\_\_\_\_\_ This is \_\_\_\_\_\_\_\_\_than water.
4. Clear plastic has a density of\_\_\_\_\_\_\_\_\_\_\_\_. This is \_\_\_\_\_\_\_than water.

3. If a density is less than water it will float. Which objects above will float?

**POM Lesson 2.3**

**Page 19**

**Problem:** **How do you find the density of irregular shaped objects?**

Independent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dependent variable: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Hypothesis\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Procedure:

Write the specific steps to find the density of an irregular shaped object called water displacement. Fill in the blanks of the procedure.

**Formula for Density\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. Find the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the object by using an electric\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

2. Find a graduated cylinder that is taller than your object.

3.. Fill the graduated cylinder with water by holding the object vertically on the outside of the cylinder to make sure the water will cover the object..

4. Find the volume of the water by looking at the bottom of the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and record it on the data table.

5. Put the object\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

6. Measure how much the water \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

7. Find Density using the above formula.

|  |  |  |  |
| --- | --- | --- | --- |
| Object | Mass (g) | Volume (mL) | Density (g/mL) |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

1. Are any of the objects made out of the same material? How do you know?
2. How do the densities of the objects compare with water?
3. Steel has a density of \_\_\_\_\_\_\_\_\_\_\_. This is \_\_\_\_\_\_\_\_than water.
4. Copper has a density of \_\_\_\_\_\_\_\_\_\_\_\_\_. This is \_\_\_\_\_\_\_than water.
5. Nylon has a density of \_\_\_\_\_\_\_\_\_\_\_\_ This is \_\_\_\_\_\_\_\_\_than water.
6. Anything that has a density less than water will float. Do any of these objects float?